Chemical Management Fact Sheet

No chemical is 100 percent "safe." Even products we call environmentally preferable still have some potential health hazard or environmental impact. The major types of risk involve eye irritation or burns, skin irritation or burns and breathing chemical fumes.

Young people are at particular risk to the hazards of chemicals because:

- They may be affected at lower levels of exposure than adults;
- Their immune systems are not as well developed as those of adults;
- Their health risks can be greater because some toxic chemicals accumulate in the body over long periods of time;
- They may be more easily distracted and may not pay careful attention to safety precautions or instructions; and,

The following steps address issues that need to be considered in the management of materials used in schools.

Maintain your chemical inventory

You should establish and implement a plan for purchasing and managing laboratory chemicals to prevent accumulating excess and undesirable ones. Inventories enable you to determine the existence of a specific chemical, its location, and approximate shelf age, thus helping to control the hazards in your laboratory.

- Maintain a complete and current inventory of all chemicals, including location, chemical names and hazards, amounts, and dates of receipt at your school. Update the inventory when chemicals are purchased or used up, and inventory your entire stock at least once a year.
- Develop purchase guidelines, which include buying chemicals in the smallest quantities needed, or only a one- to two-year supply. Consider obtaining needed chemicals from another laboratory that may not need them or has them in excess. Include green chemistry principles in your curriculum. Green chemistry reduces or eliminates the use of materials that are hazardous to human health and the environment.
- Ensure your chemical supplier provides you a material safety data sheet (MSDS) for every chemical that is purchased, and that it is maintained in the laboratory files.

Properly store chemicals

By understanding and following these guidelines and precautions, you can ensure that your chemical storage area is safe for use.

- Designate a safe and secure area for chemical storage. This will provide an area that reduces the risks of breakage and spills. It is recommended that the storage area be ventilated, locked, and fire-resistant. Limit access to your chemical storage areas to authorized personnel only.
- Keep chemicals in the storage area when not in use. This area should be clean and orderly at all times.

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- Post signs for hazardous chemical storage. All chemicals should be stored in tightly sealed containers designed for chemicals and appropriate for each type of chemical.
- Prevent accidents by storing chemicals at or below eye level.
- Do not store chemicals alphabetically. Store them by chemical group (chemical class/reactive group) to keep incompatible chemicals away from each other. Appropriate measures may include separation by shelving, and/or the use of secondary containment such as clean tubs, buckets and trays.
- Follow instructions for recommended shelf-lives of chemicals, since chemicals can become more hazardous with age. Properly discard all chemicals that each their shelf life, that are unusable, unneeded, deteriorated, and/or excess. Also, take steps to eliminate chemicals that are shock-sensitive, explosive, and highly toxic. Use caution since old chemicals may become unstable.

Waste Minimization and Pollution Prevention

To reduce potential hazards in your laboratory and the costs and potential liability incurred for waste management, minimize the generation of wastes and implement pollution prevention measures. While students are increasingly sensitive to the environment, they often do not realize how their concerns translate into specific practices that cumulatively can make a big difference.

- Consider the use of microscale chemistry, which utilize less chemicals than traditional experiments. Microscale procedures use less chemicals and equipment, result in smaller quantities of waste, are safer, and teach careful laboratory techniques.
- Include waste management and waste reduction/ pollution prevention as part of students laboratory experience and training.
- Waste minimization begins when planning an experiment. Consider the kind and quantity of waste that will be generated and adjust the experimental design to minimize it.
- Consider preparing pre-measured amounts of chemicals for an experiment into vials for each student to minimize waste and save time during the class period. Use classroom demonstrations for some of the most hazardous experiments instead of individual-based experiments.
- Consider the application of green chemistry principles. Green chemistry is the redesign of chemical transformations and processes to reduce or eliminate the use of materials that are hazardous to human health and the environment.
- Monitor experimental reactions closely and add additional chemicals only as necessary. Use chemicals sparingly.
- Examine your excess chemicals and waste to determine if there are chemical and/or waste exchange networks, or uses within other laboratories within your school system.

Report Spills. All chemical spills, which threaten public water supply, need to be reported to the Indiana Department of Environmental Management Spill Line, as legally required by the Indiana Spill Rule. For a chemical spill of any size, call the IDEM Emergency Response line at **(888) 233-7745**. If you are in doubt as to whether or not a spill needs to be reported, call the Emergency Response line. It is better to be advised your spill is not reportable than to be in violation. For more emergency response information, visit the IDEM Web site, at **www.IN.gov/idem/programs/land/er/**.

For more information on chemical management, please refer to the Chemical Management CD in your Green Steps Tool Kit.